

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.

### Suture package

We, ETHICON SUTURE LABORATORIES INCORPORATED, a company organised under the laws of the State of New Jersey, of 501, George Street, New Brunswick, New Jersey, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a suture package and more particularly relates to a suture package adapted to contain suture strands which may be sterilized in the package and withdrawn for use as desired. It is understood that sutures are used under circumstances different from ligatures, but the word "suture" will be used hereinafter as a matter of convenience to indicate either sutures or ligatures.

Textile suture materials such as silk, cotton, nylon, linen, and others have been packaged and supplied to the surgeon in the form of a continuous strand on a spool; and although such practice has achieved acceptance by the surgical profession, certain disadvantages are inherent therein. It has been necessary to sterilize a spool of such material or to remove and cut the suture material into lengths before sterilization, but this is time-consuming, inefficient and wasteful because unused strands are normally discarded. The sterilization of a whole spool of textile sutures followed by the cutting of definite lengths from the spool in the operating room is inconvenient since it adds another detail to the complicated procedure of an operating room.

It is an object of this invention to provide a suture package that will obviate the necessity of cutting strands of sutures from a spool of such material.

It is another object of this invention to provide an economic and efficient suture package containing strands of suture material.

It is still another object of this invention to provide a suture package containing strands

of suture material which may be readily and repeatedly sterilized.

It is another and further object of this invention to provide a suture package containing suture strands which may be readily and repeatedly withdrawn with minimum opportunities for contamination of the remaining suture strands in the suture package from outside sources.

According to the invention a surgical suture package comprises in combination an envelope and a carrier slidable in the envelope, the carrier including a reel and a clamping member overlying the surface of the reel and pivoted thereto, and a plurality of suture strands wound about the reel, at least one end of each strand being disposed between the reel and the clamping member, and the clamping member pressing against the strands and holding them against the reel when the carrier is in the envelope. An important feature of the invention is that it provides a package for suture strands in which the strands and particularly the ends of the strands are held in place between the reel and the clamping member and do not become snarled and entangled even after repeated sliding of the carrier in and out of the envelope for removal of strands from the package.

The invention is described more fully and shown in the accompanying drawing, in which:—

Fig. 1 is a fragmentary perspective view of a package embodying one form of the invention;

Figure 2 is a plan of a package partly broken away and showing relative positions of the parts of a sealed package;

Figure 3 is a plan of a carrier showing the position of the suture strands on the reel;

Figure 4 is an enlarged section taken along the line 4-4 of Figure 2;

Figure 5 is a plan of the envelope blank of the suture package;

Figure 6 is a plan of the carrier blank; and

Figure 7 is an enlarged section taken along line 7-7 of Figure 2.

Referring now with particularity to the embodiment of the invention illustrated in the drawings, in Figure 2 the closed suture package is shown as it is before or after sterilization. Envelope 1 of the suture package is preferably composed of paper which is permeable to steam to facilitate sterilizing of the suture package and its contents when it is closed and sealed. The envelope should not be wax-coated or plastic-coated as such coating lowers permeability to steam. Paper which darkens on exposure to steam during sterilization is preferred since this readily indicates that the suture package has been sterilized. The envelope has a flap 5, also shown in Figure 5, which has sufficient length in order to completely seal the carrier within the said envelope. Figure 5 shows the envelope blank before it is fabricated into the finished envelope. Figure 6 shows the carrier blank comprising reel 3 and clamping member 19.

In assembling the suture package, suture strands 11 are wound about reel 3 so that at least one end of each strand is positioned between the reel and clamping member 19, as shown in Figure 3, but in the preferred form of the invention the strands are folded and wound on the reel in such a way that approximately equal lengths of each strand are suspended on each side of the reel. The end portions of the threads are then folded over the bottom of the reel to the opposite sides of the reel, and in so doing the strands overlap the main portions of the threads and run in a direction opposite to that of the said main portions of the threads, as illustrated in Figure 3. In one form of the invention the end portions of the threads are positioned in a recessed portion 17 at the bottom of the reel, but the bottom of the reel may be rectilinear in shape. With the suture strands in position on the reel, the carrier is folded along the dotted line, as illustrated in Figure 6, so that the strands and particularly the ends of the strands, come in contact with clamping member 19. The folded carrier with the suture strands in position is then inserted into the envelope and in so doing the end portions of the suture strands, as illustrated in Figure 4, are tightly held between the clamping member and the reel and between one side of the envelope and the reel. The carrier is of such a size in relation to the envelope that when it is in position and fully inserted in the envelope, it is wholly within the envelope, as illustrated in Figures 2 and 4, and the suture strands are consequently wholly within the envelope. The carrier may be repeatedly partially removed from the envelope and replaced wholly within the envelope without any displacement, snarling and entanglement of the

strands because of the action of the clamping member in firmly holding the ends of the strands against the reel when the carrier slides back and forth in the envelope. Clamping member 19 of the carrier is of such length that it fills the envelope with tongue portion 7 completely inside the envelope but with tongue tip portion 9 protruding out of the envelope but not above envelope flap 5. The suture package is closed by folding tongue tip portion 9 along the dotted line, shown in Figures 3 and 6, so that this portion is positioned on the outside of the envelope but is covered when envelope flap 5 is folded down and sealed to the envelope, as illustrated in Figure 4.

The completely assembled and sealed suture package may be sterilized and transported to the operating room, where it is opened when sutures are needed. When envelope flap 5 is unsealed and folded back, tongue tip portion 9 is available to be grasped; and by pulling outwardly on the said tongue tip portion, the carrier may be withdrawn to a point illustrated in Figure 1, or to a point such that the ends of the suture strands are exposed. After the desired number of strands are withdrawn, the carrier may be pushed back into the envelope and the envelope flap folded over to prevent contamination of the suture strands from the atmosphere or other external sources.

The top of reel 3 may be rectilinear in shape or it may have at least one convexity at the top, but in the preferred embodiment of the invention the reel has at the top a concavity 13 and a concavity 15 with a convexity between the two concavities. The construction of the carrier is such, as explained above, that the strands are held tightly in position around the reel portion against the envelope on one side and against the clamping member on the other side. It is preferable when placing suture strands on the reel portion that they be positioned in concavity 13, and when in this position, removal of one or more strands is accomplished by sliding the desired number of strands over the convexity between the concavities into concavity 15, which, in the preferred embodiment, is deeper than storage notch 13. The desired strand or strands may then be readily grasped and pulled out of the assembly, as illustrated in Figure 1. While it is preferred, for ease of removal of the strands, to have concavity 15 deeper than concavity 13, said withdrawal may be made when the two concavities have the same depth.

It is contemplated that the strands may be removed by withdrawing the carrier out of the envelope partially and to an extent sufficient to expose the ends of the strands, and that one or more strands may be grasped by the ends and pulled out of the suture

package. When this method of removal of the strands is practised, the provision of two concavities at the top of the reel does not facilitate removal of strands from the suture package but it is preferred that at the top of the reel there be one concavity, having a width sufficient to accommodate the number of suture strands desired to be contained in the suture package, to assist in keeping the suture strands in their proper position about the reel.

What we claim is:—

1. A surgical suture package comprising in combination an envelope and a carrier 15 slidable in the envelope, the carrier including a reel and a clamping member overlying the surface of the reel and pivoted thereto, and a plurality of suture strands wound about the reel, at least one end of each strand being disposed 20 between the reel and the clamping member, and the clamping member pressing against the strands and holding them against the reel when the carrier is in the envelope.
2. A surgical suture package as claimed 25 in claim 1 in which the carrier and the envelope are such that the top of the reel

may be wholly within the envelope.

3. A surgical suture package as claimed in claim 1 or 2 in which the reel has at least one concavity at the top in which the suture strands are positioned.

4. A surgical suture package as claimed in claim 3 in which the reel has two concavities at the top separated by a convexity, the suture strands being positioned in one of the concavities.

5. A surgical suture package as claimed in claim 4 in which the two concavities are of unequal depth, the suture strands being positioned in the concavity of less depth.

6. A surgical suture package as claimed in any of claims 1 to 5, in which the end portions of the suture strands are folded over the bottom of the reel to the opposite sides of the reel so that the strands overlap the main portions of the threads.

7. A surgical suture package substantially as described and as shown in the accompanying drawings.

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